

REMARKS

This application has been reviewed in light of the Office Action October 2, 2003. Claims 7-15 are pending in this application, with Claims 7 and 11 being in independent form. Favorable reconsideration is requested.

Claims 10 and 14 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicants have amended Claims 10 and 14 to have them depend from Claims 8 and 12, respectively. Applicants submit that these amendments correct the antecedent basis of "said convex portion," and therefore Applicants respectfully request withdrawal of this rejection.

Claims 7-10 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,412,224 (Sugitani) and Claims 11-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugitani in view of U.S. Patent No. 4,722,824 (Wiech, Jr.). Applicants respectfully traverse these rejections.

Applicants submit that independent Claims 7 and 11, together with the remaining claims dependent thereon, are patentably distinct from the cited prior art at least for the following reasons.

The aspect of the present invention set forth in Claim 7 is a method of manufacturing an ink jet head having a substrate and a ceiling member joined to the substrate. The substrate includes a plurality of energy generating elements for generating energy utilized to discharge ink, and the ceiling member has a plurality of flow passage walls which define a plurality of flow passages when the substrate is joined to the ceiling member, the energy generated by the energy generating elements acting on the ink to discharge the ink through the plurality of flow passages. The method includes the step of

providing a plurality of recessed portions in a surface on the substrate such that the plurality of recessed portions have a bottom surface located at a position which is lower than a position of a heat acting surface of the substrate. The method also includes the step of fitting the plurality of recessed portions to the flow passage walls of the ceiling member by applying a force to the ceiling member along a direction in which the plurality of energy generating elements are arranged, thereby aligning the flow passages with the energy generating elements.

Sugitani relates to forming multiple ink flow paths in an ink-jet print head using a photo-forming technique. As shown in Figs. 1-8, flow path walls are formed by applying a dry film photoresist (5) to the substrate and exposing the film through a photomask (6). The unexposed portions of the photoresist (5) are then removed using a developing liquid, leaving a resist pattern (5P) primarily over the heat generating elements (2). To form the ink passage walls, a nickel or copper layer (7) is electroplated to a desired thickness in the spaces not occupied by the resist pattern (5P), and the resist pattern is removed. After adding an ink-proof layer (8), a ceiling plate (9) is adhered over this structure either by coating the plate with epoxy and heat bonding it to the passage wall layer (7) or by directly fusing a plate formed of thermoplastic resin.

As the above description makes clear, the passage walls (7) of Sugitani are formed directly on the substrate by photoetching and electroplating, rather than being formed on the ceiling member and fitted to the recessed portions to align the flow passages with the energy generating elements, as recited in Claims 7 and 11. Moreover, Sugitani does not teach or suggest fitting the recessed portions to the flow passage walls of the ceiling member by applying a force to the ceiling member along a direction in which the

energy generating elements are arranged, as recited in Claim 7. To the contrary, the ceiling plate (9) in Sugitani is bonded to the structure after the passage walls are fixed in position.

Thus, applying a force to Sugitani's ceiling plate in a direction along which the energy generating elements are arranged (or any direction for that matter) would not serve to align the flow passages with the energy generating elements. Likewise, Sugitani does not teach or suggest fitting the recessed portions to the flow passage walls of the ceiling member by vibrating the substrate so that a force having at least a component acting in a direction in which the energy generating elements are arranged is applied to the ceiling member, as recited in Claim 11.

Accordingly, Applicants submit that at least for these reasons, Claims 7 and 11 are patentable over Sugitani.

Wiech, Jr., as understood by Applicants, relates to a method of joining green bodies prior to bonding. Applicants submit that nothing has been found in Wiech, Jr., nor cited in the Office Action, that would remedy the deficiencies of Sugitani as described above. Thus, Applicants submit that at least for the reasons described above, Claim 11 is patentable over the combination of Sugitani and Wiech, Jr..

The other rejected claims in this application depend from one or another of the independent claims discussed above and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual reconsideration of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and allowance of the present application.

Applicants' undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,

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